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Comments:

From the SCS Chief

Conservation Tillage Helps Prevent Water Pollution

"New Dust Bowl Blues," a documentary film shown recently over cable television, raises the question of whether conservation tillage increases water pollution.

From all the evidence I have seen, conservation tillage—when properly carried out—can *reduce* the potential for water pollution. It does so by reducing the amount of soil moving off the land into streams and reservoirs.

It is true that herbicides are commonly used with various kinds of conservation tillage, including no-till. These herbicides are absorbed by plants, adhere to soil particles, and decompose within as little as 4 to 6 weeks. If the soil stays in place, then the herbicides stay with it.

Keeping soil in place also helps keep fertilizers from washing off the land. Yet some caution is needed with conservation tillage and fertilizer application. While phosphorus can become associated with soil particles, nitrogen is soluble and can move down through the soil, with the potential risk of raising the nitrate content of ground water, if applied at excessive rates.

Obviously, farmers need to follow some commonsense rules about applying fertilizers and herbicides. They shouldn't apply them when a heavy rain is forecast or when the ground is frozen. They shouldn't apply them when the wind is up. They *should* always follow the suggestions and precautions on the label.

Aside from these and similar cautions, however, the safe and proper use of chemicals on cropland should pose few problems.

It is important that we fully inform farmers and the general public about no-till and other forms of conservation tillage. Combined where necessary with other conservation practices, these new low-tillage methods are an excellent answer to serious erosion on many soils, and can be carried out without harm to the environment.

Pete Myers

Cover: Cropland erosion on a Madison County, Tenn., farm. (Photo, Tim McCabe, photographer, Public Information Staff, SCS, Washington, D.C.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, creed, color, sex, age, or national origin.

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News Briefs

Advisory Council Begins Effort to Solve Problems in Rural Development

The 24-member National Advisory Council on Rural Development to the Secretary of Agriculture met on April 14 and 15, 1982, for the first time since the council was established in January. The Rural Development Policy Act of 1980 authorized the council to assess the needs and strengths of America's rural communities and advise the Secretary on developing an effective rural development strategy.

Council members include officials of State and local governments, representatives of farm and rural development organizations, business leaders, university professors, and others. Frank W. Naylor, Jr., under secretary for small community and rural development, cochairs the council.

At the initial meeting, the advisory council outlined and ranked their rural development concerns under three main headings: State and local governments' leadership roles, financing, and new approaches. William J. Parker, Soil Conservation Service rural development director in Washington, D.C., says that one concern the council shared was the need for improved communication between natural resource agencies and local governments. SCS soil survey information, for example, can be invaluable to communities for onsite planning, but communities must know the information is available and understand how to use it.

Parker says that the council also acknowledged the need for communities to recognize farming as an integral part of rural development. Based on the 1980 census, nearly 700 counties continue to depend on agriculture for their economic base, but many of them are experiencing severe soil erosion problems. Communities must recognize that soil erosion can affect their quality of life, says Parker, and seek assistance from natural resource agencies like SCS. SCS can assist with controlling erosion and evaluating the suitability of vacant lands within the community for development.

People in rural areas need to understand how development affects the economic, environmental, and social conditions so that they can implement plans that will benefit the most people, Parker continues. Our best agricultural lands can be protected for future food production if planners evaluate existing opportunities for growth in the community and work with farm organizations and natural resource agencies to determine the best areas for expansion.

The rural development advisory council is scheduled to meet four times a year and will be looking at these and other issues.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Scouts Win USDA Conservation Awards

The 1982 U.S. Department of Agriculture Gold Seal Award for the best conservation program went to the Southwest Florida Boy Scout Council at Fort Myers. Ten other councils received Green Seal awards. Since 1960, the USDA Soil Conservation Service and Forest Service have jointly sponsored the annual awards to councils with outstanding conservation programs.

The 4,000 boys and young men who make up the Southwest Florida Council's 48 Boy Scout troops, 50 Cub Scout packs, and 25 Explorer posts are active conservationists. Among other projects, they are applying an SCS-recommended conservation plan to the 1,208-acre Southwest Florida Scout Reservation, which includes two campgrounds. In 1981, Scouts planted 5,000 pine and cypress trees, reestablished ground cover by planting native vegetation, and reclaimed a 4-acre area which had been the site of an oil drilling operation.

The Scouts' restoration work on the 4-acre camp is one of their major accomplishments. SCS District Conservationist John S. Pirie provided technical assistance. Scouts planted shrubs and trees and assisted with the construction of a central shower, shelter, and access road, which were funded by the Gannett Foundation. The new Frank E. Gannett Camp is designed especially for use by Cub Scouts and their families.

During a week-long conservation camp at the reservation, conservation experts from several agencies, including SCS, led the Scouts in sampling, identifying, and classifying the fish population in a lake; attaching radio transmitters to quail and plotting their movements; selecting, marking, and removing poor trees in a pine forest to improve productivity; studying soil samples and the characteristics that make soils suitable or unsuitable for certain uses; identifying grasses and what makes some of them better conservation plants; and many other activities.

In their home communities, members of the Southwest Florida Council are concentrating on achieving the World Conservation Award which involves earning several difficult merit badges. One big project for the Scouts is planting grasses to control shoreline erosion.

Scout Executive Randall Beaver with the Boy Scouts of America says that resource conservation is an important consideration for people in Florida, and local, State, and Federal agencies provide tremendous support to the Scout program.

Green Seal awards went to the following councils: Bucktail, DuBois, Pa.; Northeast Georgia, Athens, Ga.; Cherokee, Burlington, N.C.; Stonewall Jackson, Waynesboro, Va.; Wabash Valley, Terre Haute, Ind.; Northeast Ohio, Painesville, Ohio; Miami Valley, Dayton, Ohio; New Orleans Area, Metairie, La.; Pony Express, St. Joseph, Mo.; and Mount Diablo, Walnut Creek, Calif.

Tom Levermann,
education specialist, Public Information, SCS, Washington, D.C.

Canadians Visit to Learn About Saline Seep Control

Seven agricultural specialists from four Provincial and Federal Canadian agencies spent 2 days in early June in north-central Montana learning how a special conservation district team operates. The Canadian Government has set up a saline seep control project in Alberta modeled after Montana's Triangle Conservation District (CD). The Triangle CD is a special district with a team for saline seep identification and control. Saline seeps, or salty areas on nonirrigated cropland, have affected about 2 million acres of dryland cropland in the northern Great Plains. The area includes parts of Montana, Wyoming, the Dakotas, and Canada.

The Canadian agencies represented included: The Alberta Agriculture, Alberta Environment, Prairie Farms Rehabilitation Administration, and Agriculture Canada. A formal memorandum of understanding between the Triangle CD and the new Canadian project is being developed for joint saline seep control.

Brad Anseth,
public information officer, SCS, Bozeman, Mont.

Oklahoma Holds Soil Survey Celebration

Oklahoma marked the completion of a once-over soil survey for the State by holding a Soil Survey Jubilee on May 20, 1982. Over 400 people attended the celebration near Haskell where the last acre of the last survey was mapped.

The celebration centered around soil scientists and others who had worked on the 44-year effort to complete the soil survey on more than 44 million acres. Special recognition was given to Louis E. Derr, who began work as a trainee on the soil survey in 1935 on the Stillwater Soil Erosion Demonstration Project (Soil Erosion Service). Derr became the State soil scientist in 1945 and later became the assistant director for soil survey operations in the National Office. He retired from the Soil Conservation Service in 1971.

The Soil Survey Jubilee was recognized as an official Diamond Jubilee event (Oklahoma is celebrating its 75th year of statehood this year).

The soil survey work was begun in Oklahoma in 1907 by USDA's Bureau of Soils at the request of the Indiahoma Farmers Union.

According to Roland Willis, SCS State conservationist, requests for soil surveys increase every year. During 1981, SCS offices in Oklahoma provided 6,800 published county soil surveys to users upon their request. These requests came from a wide variety of professions, including engineers, planners, tax assessors, universities, real estate salespeople, oil companies, banks, and others.

F. Dwain Phillips,
public information officer, SCS,,Stillwater, Okla.

Land Judging Contest Winners Announced

More than 850 individuals from 33 States competed in the 31st Annual International Land, Pasture, and Range Judging Contest in Oklahoma City, Okla., May 5 and 6, 1982.

The contest, billed as the "Olympics of Land Evaluation," was sponsored this year by the Federal Land Bank of Wichita and its associates in Oklahoma, Kansas, Colorado, and New Mexico.

The event has three divisions: 4–H, Future Farmers of America (FFA), and Adult. Teams compete in land judging, pasture and range judging, and homesite evaluation. Trophies, medals, and cash awards are given to the top teams and individuals with the highest scores.

The contest is set up and run by the Soil Conservation Service, Extension Service, Farmers Home Administration, Agricultural Stabilization and Conservation Service, the Oklahoma Conservation Commission, and other groups and agencies.

This year's winners were:

Land Judging
4–H: Shelbyville, Ind., team
4–H High Individual: Cindy Burbrink, Edinburgh, Ind.
FFA: South Lenori, N.C., Chapter Team
FFA High Individual: Carl Jantz, Weatherford, Okla.
Adult: Charles Metcalf, Richmond, Ky.

Pasture and Range Judging
4–H: Barber, Kans., team
4–H High Individual: George Schreiner, Sharon, Kans.
FFA: Henrietta, Tex., team
FFA High Individual: Randall Schaffner, Henrietta, Tex.
Adult: Ray Ethridge, Medicine Lodge, Kans.

Homesite Evaluation
4–H: Ford County, Kans., team
4–H High Individual: Bonnie Brown, McIntosh, Fla.
FFA: Washington Township, Ind., team
FFA High Individual: David Larson, Moran, Kans.
Adult: Elvin Smith, Valparaiso, Ind.

F. Dwain Phillips,
public information officer, SCS, Stillwater, Okla.

Irrigation Group Forms Foundation

The Irrigation Association has announced the chartering of The Irrigation Association Educational Foundation, a nonprofit organization designed to accept tax-deductible contributions to fund educational projects related to the irrigation industry.

The purposes of the Foundation, quoting from its Articles of Incorporation, are to "provide scholarships and fellowships for education in the field of irrigation and other related fields; to endow or establish professorships at colleges and universities; to assist educational research projects; to grant and confer awards, citations, or medals primarily in recognition of educational or other meritorious work in the area of irrigation; and lastly to provide for the preparation and dissemination of educational information concerning irrigation and related subjects by

such means as publications, exhibits, lectures, and seminars."

The board of directors of the Foundation began fund-raising in mid-May. They hope to raise sufficient monies to initiate at least one major educational program for the industry in 1982.

A brochure outlining the goals, purposes, and objectives of the Foundation may be obtained by writing The Irrigation Association Educational Foundation, 13975 Connecticut Avenue, Silver Spring, Md. 20906.

Great Plains Wind Erosion Down Sharply

Wind damaged less than half as much land in the Great Plains from November 1981 through May 1982 as it did during the same period a year earlier. Peter C. Myers, chief of USDA's Soil Conservation Service, said reports from the 10-State area indicate wind damaged 5,107,985 acres, down sharply from 12,488,237 wind-damaged acres for the same 7 months a year earlier.

Myers attributed the drop in damaged acres to good snow cover and adequate soil moisture.

Of the total land reported damaged, 91 percent, 4,653,338 acres, was cropland; 8 percent, 381,200 acres, was rangeland; and 1 percent, 73,447 acres, was other land.

Texas, with 1,641,508 acres damaged, accounted for 32 percent of all land damaged. The southern plains reported 69 percent of the damaged acreage. Major decreases were recorded in Montana, North Dakota, South Dakota, Colorado, New Mexico, and Oklahoma.

Wind also destroyed crops or cover on 529,585 additional acres of land not damaged. Of this, 72 percent, or 381,445 acres, was in the southern plains.

Each year, the Soil Conservation Service compiles wind erosion reports covering 7 months—November through May—using data supplied by 541 counties in the Great Plains.

Planter Programs Promote No-Till

Conservationists in Iowa expect a large increase in no-till and till-planted acres during the next few years, partly the result of planter loan programs. This past spring, 1,500 farmers tried no-tillage and till planting on 50,000 acres by participating in planter loan programs in 72 of Iowa's 99 counties.

"The planter programs allow farmers to try a few acres without having to buy new equipment," said William Brune, Soil Conservation Service State Conservationist in Des Moines. "Once they see a few acres of no-till crops on their own farm, we're confident that a lot of them will go all the way."

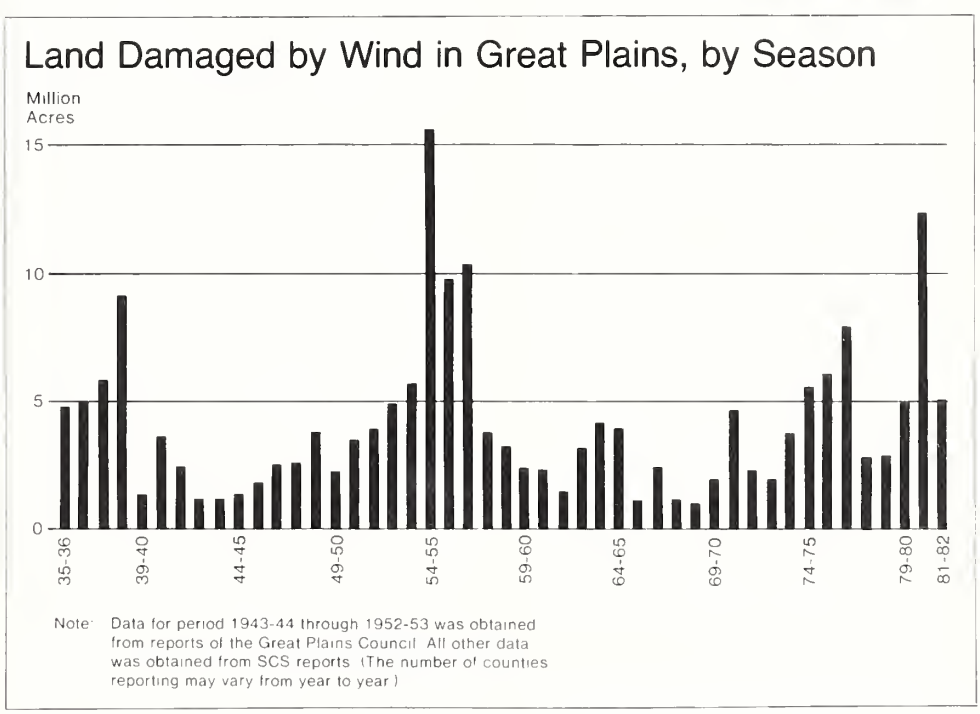
Most (144) of the 182 planters made available this year were owned by farm equipment dealers. The rest were owned by farmers (24), soil conservation districts (11), a bank (2), and a county conservation board (1). Farmers were usually charged between $5 and $10 an acre to use the planters. Most were four- or six-row units with monitors and some were provided with tractors and operators. Farmers were usually expected to provide fuel, seed, and chemicals. Along with the planters, several no-till cultivators and sprayers also could be rented. Because of considerable interest in using the equipment, farmers were usually limited to planting 20 to 40 acres, or 1 day's use.

In addition to the planter rental programs, more than 300 Iowa farmers said they would be willing to do custom no-till or till planting work.

In 85 Iowa counties, farmers trying no-tillage or reduced tillage were eligible for Federal incentive payments through USDA's Agricultural Stabilization and Conservation Service, or State or county payments through soil conservation district offices.

Last fall, SCS estimated that 4,200 Iowa farmers planted no-till and till-planted crops on nearly 445,000 acres in 1981.

Dean Miller,
public information officer, SCS, Des Moines, Iowa



Roadside Erosion Control

Conservation District Surveys Townships to Find Roadbank Problems

Conservation district directors in Greene County, Pa., saw a need to help townships with their number one problem: roadbank erosion. A district-sponsored workshop—with sessions on erosion control, landslides, and slips—aroused the interest of many township supervisors in getting help from the district.

To find out the extent of the problem, the district directors gave each township supervisor a map on which to locate roadbank problem areas and a questionnaire on which to indicate whether the problems were from slips, streambanks cutting into roadbanks, or roadbank erosion. Most of the township supervisors indicated slips were their biggest problem.

Fourteen of the 20 townships in Greene County were interested in working with the conservation district and the Soil Conservation Service to solve their roadbank erosion problems. Under a Resource Conservation and Development (RC&D) measure, the townships could share the cost of the work with SCS. Greene County is in the SCS Penn's Corner RC&D project area.

Because so many townships were interested in getting help, the district board had to decide in what order to do the projects based on criteria such as bus routes, access to an area by emergency vehicles, and total number of sites in a township.

The first RC&D measure was on Old Town Road in Cumberland Township. In the past, soil slides had blocked fire and other emergency equipment from the only access to about 10 homes. To correct the problem, the slide area was cleared of vegetation and 500 feet of subsurface drainage was installed. A surface inlet was installed to control runoff and a culvert pipe was replaced, then the area was graded and seeded.

Other measures have been planned and three have been designed.

Karl M. Neiderwerfer,
district conservationist, SCS, Waynesburg, Pa.

Districts Act to Stop Gullies in Their Tracks

Three soil and water conservation districts (SWCD's) in southeast Alabama are using Public Law 83–566 small watershed program cost-sharing funds to stabilize more than 200 gullies threatening prime farmland, pastureland, forest land, and roads.

In cooperation with the Soil Conservation Service, the Coffee, Dale, and Geneva SWCD's are doing the stabilization work in the Wilkerson Creek watershed. Wilkerson Creek flows mostly through Coffee County to the Choctawhatchee River which empties into Choctawhatchee Bay at the Gulf of Mexico.

This area is particularly susceptible to gully erosion because of its loose, sandy loam soils and slopes of up to 12 percent, with dominant slopes of 5 to 8 percent. Farmers plant on the broad, flat ridgetops between the smaller tributaries of Wilkerson Creek. Major storms carry large amounts of concentrated surface runoff from the cropland, forming numerous gullies.

In the watershed, soil erodes from roadside gullies and other gullies at the rate of 100 to more than 1,500 tons per acre per year, more than from sheet and rill erosion. Erosion has been depositing an average 67,400 tons of sediment each year downstream. The sediment fills streams, causes floods, and damages pastureland, cropland, and forest land.

The banks of some of the larger gullies have collapsed, after being undermined by erosion, and formed steep vertical walls that have turned the gullies into canyons. More than 40 of the largest gullies cover areas from 0.2 to 12 or more acres and are from 2 to 70 or more feet deep. For example, one of these gullies is about 1,600 feet long, 200 feet wide, and 50 feet deep. This gully is very slowly advancing upstream from Wilkerson Creek and has already split a road in half.

There are 26 roadside gullies in this watershed. Besides destroying productive land, leaving ugly gashes on the rural landscape, and closing some roads, the larger roadside gullies endanger motorists. When people use the roadside ravines as garbage dumps, they create possible health hazards from contaminated water.

SCS recommends three basic ways to stabilize gullies, depending on their size. For the largest gullies, SCS recommends installing a drop structure, which involves building a small dam and using a large pipe or a concrete flume, or both, to carry water to the bottom of the gully and then to a more level outlet. For medium-sized gullies, SCS recommends installing underground outlets with tile pipes. For the smallest gullies, SCS recommends planting bermudagrass and bahiagrass to stabilize the soil.

The districts and the local county commissions are responsible for shaping and leveling the gullies to prepare them for the structures or vegetation. Following SCS guidelines, a private contractor installs the needed structures and plants the recommended grasses. The contractor plants vegetation on disturbed areas around all the gullies. The U.S. Department of Agriculture's Forest Service and the Alabama Forestry Commission plant pine trees along some roadside gullies and around some gullies in pastureland and forest land.

The watershed plan calls for treating the major gullies first because, in many cases, farmers cannot install water disposal systems such as terraces, waterways, and underground outlets, until the gully outlets are stabilized.

After the major gullies have been treated, work will begin to protect prime farmland by installing water disposal systems that will spread the concentrated surface runoff and carry it slowly down the rolling landscape without undue erosion.

Morris S. Gillespie,
public information officer, SCS, Auburn, Ala.

Hydroseeding to Control Roadbank Erosion in Kentucky

This fall, the Daviess County Conservation District in Kentucky will spray an artificial mulch, mixed in a green slurry with seeds and fertilizers, on critically eroding roadbanks.

Daviess County is at the western edge of Kentucky's coalfields, bordering the Ohio River, 120 miles southwest of Louisville. County farmers raise beef and dairy cattle and grow tobacco, small grains, and some truck crops.

Last fall, with assistance from the Soil Conservation Service in cooperation with the Green River Resource Conservation and Development Council, the Daviess County Fiscal Court began a 3-year project to control roadbank erosion on county roads. The county hired contractors to begin spraying the slurry on a total of 43 acres of roadbanks at more than 100 sites. So far, the contractors have sprayed 20 acres and plan to spray at least 10 more acres in the fall.

The contractors used a mulch made of ground processed wastepaper colored green. Some artificial mulches use wood pulp instead of wastepaper. This fall, the contractors will mix the mulch with 'Kentucky 31' tall fescue seed, annual ryegrass seed, fertilizer, according to SCS specifications, and water in a specially designed 1,500-gallon tank. An agitator in the tank mixes the ingredients into a slurry.

The contractors spray the mixture with a hose attached to the truck-mounted tank and can spray up to 200 feet from the road, reaching steep banks inaccessible to conventional planters.

Each spring the contractors add sericea lespedeza seeds to the mixture and also go back over the areas planted to grass the previous fall to spray just sericea lespedeza seeds. They do this because SCS recommends planting sericea lespedeza in the spring only. When the contractors plant in the spring, they do not use the mulch in the mixture because it doesn't protect the soil from spring rains or hold moisture as well as chopped straw does.

The artificial mulch does provide adequate cover in the fall when the storms are not as intense and does not need an oil-based emulsifier to hold it down as straw does. It can also be applied at the same time as the seeds and fertilizers, unlike the straw which must be applied separately by a straw blower.

Many of the county roads are narrow and covered with blacktop or gravel. Farmers plow close to the roadbanks, and sediment from their fields fills the drainage ditches, causing water to spill onto the roads. The water seeps under the blacktop and damages it as the water expands and contracts when it freezes and melts. The runoff also covers the blacktop with mud and washes away stones from gravel roads, forming muddy ruts.

The artificial mulch is saving the county thousands of dollars a year in mulching and road maintenance costs, as well as saving its soil.

Fabric Road Beats the Mud

People living in Crawford County in northwestern Pennsylvania have recently witnessed a rapid increase in gas and oil well drilling. Most of the soils in the county have a high water table and a low bearing capacity. When the oil and gas companies built access roads to a drilling site, they usually bulldozed the vegetation, exposing the wet soil. It wasn't long before they had to drag their equipment through a muddy mess to the drilling site.

Township officials were concerned about damage to township roads and ditches caused by excessive erosion of the wet soils, especially during periods of rainfall and snowmelt. Farmers also were concerned about erosion damaging their fields.

The Soil Conservation Service helped the drilling companies adopt an easy way for companies to keep their equipment out of the mud. First, the woody vegetation is cut flush with the ground. Next, a filter fabric is rolled over the wet ground surface. As the fabric is rolled out, compactible road fill is placed on top to anchor it. Finally, it is covered with about 18 inches of road fill. Depth of fill depends on the bearing capacity of the soil as listed in the SCS soil survey, and ranges from 15 to 30 inches.

The results have pleased the drilling company officials. The saving in not having to drag equipment through mud more than offsets the cost of the fabric. They are also pleased to have an all-weather road to service the well.

Township officials and farmers are pleased that sediment is kept out of road ditches and fields.

William Branigan,
district conservationist, SCS, Meadville, Pa.

Erosion Control Puts a River on the Road to Recovery

The Soil Conservation Service has shown how to stop sediment at its source along the Grass Valley Creek which flows to the Trinity River in northern California. The Trinity, a sinuous 50-mile river, flows through the steep, wild country of Trinity County before joining the Klamath River and emptying into the Pacific Ocean. About 340,000 tons of sediment a year was entering the Trinity before local citizens began efforts to protect it.

The Trinity River was once a prime fishing area for king salmon and steelhead as well as a recreation area. Over the years erosion of the steeply sloping granitic soil, particularly in the upper watershed around Grass Valley Creek, led to sedimentation which clogged tributaries, covered fish spawning areas, and filled in resting and feeding holes.

The decomposed granitic soil in the 24,000-acre Grass Valley Creek watershed is stable in its natural state but causes serious problems when it is disturbed. The soil contains little clay or silt to hold the coarse granite particles together. Rain falling onto roadways, road cuts, and fills easily picks up the particles and carries them downstream. Natural soil erosion compounded by logging operations and roadbuilding in the area

began spelling disaster for the fishing industry on the Trinity River in the 1940's and 1950's.

A dam built on the Trinity in 1960 intensified the fish habitat problems by cutting off 75 miles of upstream river and tributaries. A hatchery was built to alleviate the loss but, in 1964, a flood dumped tons of sediment on the undammed south fork, effectively destroying salmon habitat. Meanwhile, commercial ocean fishing became more efficient, and, combined with deteriorating spawning grounds, cut salmon and steelhead returning to the Trinity River by 90 percent.

In 1968, local people formed the Trinity River Basin Fish and Wildlife Task Force which included representatives of State, Federal, and local agencies. In 1970, the task force issued a report identifying decomposed granite sediment as the leading cause of declining habitat in the river and recommended dredging the sand and building new spawning and resting pools.

But these efforts did not stop the decomposed granite from rolling down sidestreams and choking the river. In 1976, the task force asked the Soil Conservation Service to treat erosion problems on the worst sediment-contributing tributary—Grass Valley Creek. Emergency treatment funds were granted under a Bureau of Reclamation program and Ron Zinke, who was the SCS representative on the task force and is now district conservationist for Nevada County, assisted with developing a treatment plan. The Trinity Resource Conservation District (RCD) administered the funds.

When Zinke reviewed the watershed, he found most of the logged-over areas had begun to heal naturally. However, critical areas on logging and private roads and along a major highway were a continuing source of sediment.

A road cut stabilization program was begun under a cost-share agreement with the California Department of Transportation. Through the Trinity County RCD, SCS provided technical assistance with hydromulching and seeding more than 150 acres of road cuts, surfacing 11.6 miles of road, and constructing debris basins along the highway to catch silt before it entered the creek. About 60,000 willow cuttings, 50,000 conifers, and 450 Arizona cypress were planted to stabilize the granitic soil.

On private roads, down drains and culverts were installed to reduce soil erosion by carrying water safely from higher elevations through a pipe to a sediment basin. Road cuts were revegetated, trees were planted on fill slopes, and an 8-mile stretch of heavily used road was resurfaced with rock.

Trinity County citizens supported adoption of a grading ordinance in February 1981 to regulate road construction on the steeply sloping fragile soil and protect the stabilization work that had already been done. The ordinance establishes standards and specifications for construction of the road base and drainage systems and for revegetation of disturbed areas. A preliminary soil survey of the Grass Valley Creek watershed was published in May 1981 to help identify potential problem areas.

Soil stabilization and revegetation work in the Grass Valley Creek watershed alone will not solve all the Trinity's woes. Flows from the dam will have to be modified, and better management of the hatchery, better ocean fishery management, and more dredging of the creek to remove the sediment and restore the streambed for fish production are needed. Long-established land use patterns will also have to change. But, SCS and the Trinity County RCD have shown how to stop sediment at its source—by slowing down or stopping soil erosion.

Many of the practices demonstrated in the project are being adapted to other California watersheds with similar problems. King salmon and steelhead populations in the Trinity River are beginning to improve.

Robin Frazier,
public information specialist, SCS, Redding, Calif.

Road Dams Replace Bridges

Spring snowmelt or heavy rains that result in excessive water runoff usually mean flooded land, damaged roads, washed-out bridges, and tons of topsoil washed away. Officials in Nebraska are solving these problems by replacing old or damaged bridges with road dams.

A road dam is an earthen structure with a road built along the top, and a drainage pipe buried in it to carry excess water.

One of about 50 road dams built in Nance County in 1979 replaced a narrow bridge on a county road. The new road over the dam is almost twice as wide as the old bridge and has the added advantage of lower maintenance costs and greater load limits.

The dam stores water in a pond to control floodwaters in the stream's 2,300-acre drainage area. Before the dam was built, the stream had carved large gullies as it wound through the valley, leaving a 30-foot-high wall immediately downstream from the bridge.

Contractors graded the wall area and filled in the base of the valley to raise the dam high enough to store water. They used a hydro-seeder to plant a mixture of native grasses, following Soil Conservation Service recommendations, on all disturbed areas, including the slopes of the dam and the gully wall.

The Lower Loup Natural Resources District supplied the materials for the dam and Nance County and a local farmer, Leonard Scott, paid the remaining costs. Scott uses the impounded water for livestock and irrigation. SCS planned, surveyed, designed, and inspected the dam.

Contractors have built about 700 dams in Nebraska since the 1940's, mostly on county roads but some on State highways, to slow down erosive streams, reduce maintenance costs, and give motorists a safe way to cross the streams.

Don W. Gaddie,
district conservationist, SCS, Fullerton, Nebr.

Management Tips

Readers are invited to submit "Management Tips" to the editor, *Soil and Water Conservation News*, Soil Conservation Service, P.O. Box 2890, Washington, D.C. 20013.

SCS and Districts Promote No-Till in Mississippi

In Mississippi, annual soil losses on cropland average 10.9 tons per acre and some counties are losing more than 30 tons per acre. The Soil Conservation Service and the State Association of Conservation Districts are pooling their resources to control cropland soil erosion by promoting no-till.

Together, the agencies sponsored seven conservation tillage clinics across the State from January through March. Successful no-till farmers told the more than 1,200 farmers who attended the clinics about the money and soil they had saved with no-till and the improved water quality.

To demonstrate the high yields possible with no-till soybeans, the association of districts and a chemical company are sponsoring a contest. The no-till soybean farmer with the highest average yield in the State will win a trip to Bermuda and to the National Soybean Convention held in Nashville, Tenn. First, second, and third place winners will also be selected for each of seven areas and these no-till soybean farmers will win 19-inch color televisions, 13-inch color televisions, and television-radio combinations respectively. SCS will be providing technical assistance to contestants and judges. The yield data from the contest will show that Mississippi farmers are successfully using no-till on many different types of soil. All yield data for the contest must be in by December 1, 1982.

The Calhoun County Soil and Water Conservation District's purchase in 1981 of a no-till drill to rent to farmers is an example of what individual Mississippi conservation districts are doing to promote no-till. Dudley Davis, who chairs the district board, says cooperators can now try no-till without making a big investment in equipment. The drill is available to farmers on a first-come-first-served basis. The $2 rental fee covers maintenance and repairs.

Since the district began renting the drill to farmers, Mike Lane, SCS district conservationist for the Calhoun district, says, "Several cooperators have purchased no-till planters, and no-till acres leaped from none in 1980 to more than 1,200 in 1981."

No-till is becoming increasingly popular with Mississippi farmers who are interested in growing double crops of wheat and soybeans. Statewide, farmers used no-till on more than 190,000 acres in 1981, an 80-percent increase over 1980.

James S. Parkman,
conservation agronomist, SCS, Grenada, Miss.

Chuck Jepsen,
public information officer, SCS, Jackson, Miss.

Conservation District Helps Beekeepers

To prevent accidental poisoning of beehive operations, the Clinton County Soil and Water Conservation District (SWCD) in New York has recently begun an information clearinghouse on pesticide spraying. County beekeepers register their locations with the SWCD office in Plattsburgh, and township officials who plan to spray insecticide for gypsy moths, mosquitoes, blackflies, and other pests, can call the office for the beehive locations. Officials can then notify any beekeepers whose operations might be affected by the spraying of the dates, times, areas to be sprayed, insect to be controlled, chemical to be used, dosage, method of application, and any other pertinent information.

This new district program was designed especially to serve township governments, but private landowners such as farmers, orchardists, and campground managers, who might spray pesticides toxic to bees, are also encouraged to use the clearinghouse. The clearinghouse on pesticide spraying is just one of the wide range of activities through which the Clinton SWCD serves the agricultural community.

Stephen A. Mahoney,
district technician, Clinton County Soil and Water Conservation District, Plattsburgh, N.Y.

Districts Always Find a Way to Sell Conservation

Conservation districts everywhere take the job of selling natural resource conservation seriously. Recently, two districts, the Morton County Soil Conservation District (SCD) in North Dakota and the Boundary SCD in Idaho, have tried some new ways to get the job done.

With the help of a local supermarket and a creamery, the Morton County SCD advertised on grocery bags and 2-quart milk cartons the need for soil and water conservation for adequate food production. Shoppers couldn't miss the striking conservation message or the name of the district who sent it.

In Idaho, the Boundary SCD has begun publishing a newsletter for the first time in 25 years thanks to some generous district supervisors. Operating the district on a tight budget, the supervisors are donating the money set aside for their mileage expenses to fund the quarterly newsletter. A weekly county newspaper with a circulation of about 5,000 has been running the half- to full-page newsletter since August 1981.

Theodore Hawn, Soil Conservation Service district conservationist, masterminded the newsletter and says that public response has been tremendous. He says that the newsletter has brought much recognition to the district for its conservation work and has put the district in touch with many more landowners requiring conservation assistance.

CONSERVATION Research Roundup

Safe Disposal System for Pesticides

Ten years of pesticide disposal in a large pit at Iowa State University (ISU) in Ames, has resulted in no environmental pollution, according to Charles Hall, head of ISU's horticulture department.

The concrete-lined pit was designed and constructed by the ISU agricultural engineering department in 1970 to handle the large volume of pesticide wastes generated at the ISU horticulture research station. Since then, Hall says some 45 different agricultural pesticide compounds have been dumped into the pit which is 12 by 30 by 3 feet deep at one end and 4 feet deep at the other.

The pit is filled with alternating 1-foot layers of gravel and soil. Hall explains that the gravel and soil stimulate the natural biological and chemical breakdown of the pesticides.

In 1976, the U.S. Environmental Protection Agency provided ISU with a 3-year grant to closely monitor the biological and chemical breakdown of the pesticides and to detect any environmental contamination in the area of the pit. Sampling of ground water from tiles underneath the pit have indicated no leakage through the concrete. Monitoring equipment above ground has detected nearly no air pollution.

Researchers have seen no harmful effects to area plant life and no contamination of nearby water systems. Although an average of 6,000 gallons of diluted liquid insecticide, herbicide, and fungicide wastes have gone into the pit each summer, water vapor has been the only escapee from the system.

Hall feels that a smaller pit built to the same specifications would be as effective for use by farmers on their farms.

Experiments with smaller pesticide receptacles such as plastic garbage cans and other plastic containers have led Hall to advise against using them. Freezing and thawing eventually cause such containers to crack and rupture. The best bet for the average farmer would be a 36-inch concrete culvert tile with one open end sealed with concrete.

It is important that there be some kind of cover for excluding rainfall in order to avoid overflow. The cover should be elevated to permit free air circulation over the pit surface.

Monitoring ISU's disposal pit will continue.

Gene Hettel,
commodity specialist, Iowa State University, Ames, Iowa.

Reprinted from the Sept. 12, 1981, issue of *Wallaces Farmer*.

The Effect of Soil Erosion on Yields

Last fall, Purdue University researchers sampled corn yields for the first year of a 3-year soil erosion study and saw a definite trend toward lower yields on severely eroded soils, compared to uneroded or slightly eroded soils.

The researchers are working cooperatively with USDA's Agricultural Research Service and Soil Conservation Service to more effectively quantify the effects of sheet and rill erosion on yields. They sampled yields on several sites with different degrees of erosion, in fields in three Indiana counties with three major soil series: Miami, Corwin, and Morley.

Those conducting the study felt the abnormally wet 1981 cropping season masked the real differences in yields between severely eroded and uneroded or slightly eroded sites that would occur when crops experience moisture stress between rainstorms.

Their data show a decrease in phosphorus in the plow layer on the severely eroded soils, compared to less eroded soils. This may be caused by the loss of fine soil particles with phosphorus attached. The scientists are analyzing the changes in organic matter and percentages of sand, silt, and clay in the plow layer as erosion increases.

They will try to develop standardized sampling procedures for corn and soybean yields for possible regional studies to help SCS and other USDA agencies predict the true yield differences between uneroded or slightly eroded soils and severely eroded soils.

These agencies, along with economists, conservationists, and others, need to know the costs of erosion to calculate the benefits of erosion control.

Check for Acidic Layer With Reduced Tillage

When nitrogen is topdressed in a shallow or no-till system for several years, an acid soil layer potentially could develop in the top few inches of soil, says Bob Pope, University of Illinois Extension agronomist. This specialized condition occurs mainly under continuous no-till production.

The reason for the potential layer of acid soil has to do with the distribution of nitrogen. Because nitrogen fertilizer can increase soil acidity (which means it lowers pH), topdressed nitrogen with no-till can cause an acid layer in the top few inches of soil.

Low pH in the top 2 inches of soil has not reduced yields in the University of Illinois studies, but Pope notes that it can reduce the effectiveness of triazine herbicides.

To detect thin acidic zones, he recommends that you sample the top 2 inches of soil at the same time you take the regular soil-test sample from the 6- to 8-inch "plow layer."

"If the shallow samples are acidic, you can correct the situation by applying a reduced lime rate to the soil surface," Pope says.

He also points out that most Illinois soil-testing labs assume that moldboard plowing to a depth of 9 inches will be used to incorporate limestone. When your tillage system does not reach that depth, reduce the limestone rate proportionately, he suggests.

If you fail to do this, there is a chance of overliming the surface soil, resulting in high pH. High pH levels increase the risk of triazine herbicide injury.

Soil Compaction May Cause a Problem With Conservation Tillage

"Conservation tillage is a proven retardant of soil erosion," says Ward B. Voorhees, soil scientist with USDA's Agricultural Research Service. "But we're concerned about erosion and water runoff from compacted wheel tracks in no-till systems."

Compaction increases both soil erosion and water runoff in the wheel tracks, Voorhees says. This problem may be reduced by concentrating plant residues where the wheels have run.

Voorhees' research on a clay loam at Lamberton, Minn., also shows that a soil in conservation tillage systems can be more porous than soil that is moldboard plowed but only in places where there is no wheel traffic. Farmers who use conservation tillage to improve porosity should not be discouraged if they don't observe the benefit the first year, and they may be well advised to use controlled traffic patterns, he says. He found that, in the absence of wheel traffic compaction, it may take about 3 years for the 0- to 3-inch layer of chisel-plowed soil to become as porous as moldboard-plowed soil, and an additional 3 years to see a permanent beneficial effect in the 3- to 6-inch layer.

A no-till system may be undesirable on a heavy soil or a soil that has marginal tilth at the outset, says Voorhees, but where conservation tillage systems are desirable, most tractors used in the operations are light enough to keep from compacting the subsoil. As a rough rule of thumb, compaction will be confined to the 8- to 10-inch depth if the axle weight is not more than 5 tons.

A combine with a six-row header, however, may have a load of 10 tons on the front axle, without any grain in the bin. Tricycle type fertilizer spreaders with wide flotation tires sometimes carry 14 tons on the rear axle when loaded—4 tons more than the legal limit on many hard-surfaced public roads.

Whether the wide tires on extremely heavy machinery keep compaction from being as great as compaction from lighter machinery is a question that Voorhees is researching in the field. Laboratory tests indicate that the total load may have a more important bearing on subsoil compaction than the pounds per square inch that a tire exerts.

A moderate amount of compaction may be desirable at times, Voorhees says. His research shows that moderate compaction tends to increase both corn and soybean yields, especially if soil phosphorus level is low. He attributes this phenomenon partially to increased root branching in the moderately compacted soil.

Corn Residue Does Good Work

"Corn residue will hold herbicide and fertilizer where you put them, even under heavy rainfall," according to Agricultural Engineer John M. Laflen.

Laflen, with USDA's Agricultural Research Service, and Iowa State University Agricultural Engineer James L. Baker applied fertilizer and herbicide on test plots both with and without corn residue on the surface. On some plots, they placed residue after fertilizer and herbicide had been applied.

The engineers then applied 5 inches of water in a 2-hour period with a rainfall simulator. They measured the time it took for runoff to begin, the amount of runoff, and losses of soil, herbicide, and plant nutrients.

The plots were on a Clarion sandy loam soil with a 5 percent slope. The plots were disked a week before the tests and fertilizer and herbicide applied the day before the tests, Laflen said.

Soil covered by corn residue at a rate of 1,336 pounds per acre (about the amount left after chisel plowing, two diskings, and planting) lost about 0.7 inch of water as runoff, beginning about 30 minutes after application. The water carried off soil at a per-acre rate of 0.45 ton along with 0.1 percent of the applied herbicide and 1.6 pounds of plant nutrients.

Plots without the corn residue covering began losing water 11 minutes after application began and lost half of it, 2.5 inches, as runoff. Losses were 4.9 tons of soil per acre, 7.0 percent of the herbicides, and 6.6 pounds of plant nutrients.

"The research results show that residues increase the time it takes for runoff to begin and decrease the runoff amount, reducing losses of soil, herbicides, and plant nutrients," Laflen said.

High Erosion After Soybeans

Research conducted at Iowa State University's Research Center near Beaconsfield, Iowa, showed that soil losses, when corn followed soybeans, averaged 4.3 tons per acre when measured from spring plowing to spring plowing. Soil losses when corn followed corn were 3.1 tons per acre. When soybeans followed corn, losses averaged 2.9 tons per acre.

John M. Laflen, an agricultural engineer with USDA's Agricultural Research Service, measured the soil and water losses over a 7-year period. He conducted the study on a Grundy silt loam with a 6-percent slope using conventional tillage systems.

"Based on the results of this study, under continuous row cropping conditions, soil losses from corn following soybeans would exceed losses from soybeans following corn or from corn following corn by more than 40 percent," Laflen said.

"While erosion on crops grown after soybeans may be considerably greater than from crops following corn, good erosion control might be achieved by wise use of a conservation tillage system," he said. "For example, other research by our USDA research team at Iowa State University has shown that soybean residues will provide good erosion protection if no-till planting into soybean residues is used."

New Publications

Soil Conservation Policies, Institutions, and Incentives

Edited by Harold G. Halcrow, Earl O. Heady, and Melvin L. Cotner

This book is a collection of material presented at a symposium held in Zion, Ill., in May 1981. The 330-page book provides a historical perspective of conservation efforts, especially in public programs. It critiques the soil conservation policy process, examines the role of the various participants in conservation decisions, and re-examines the rationale for public and private action to conserve soil. Finally, the book evaluates some alternative strategies to achieve conservation.

Natural resource managers, administrators, academicians, legislators, and anyone who debates, plans, and implements soil conservation activities should find these discussions timely, incisive, and comprehensive.

This book is available for $6 (postpaid) from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021.

Irrigation System Selection in an Energy-Short Economy

by Verel W. Benson, Curtis Everson, and Rodney Sharp

This report looks at the decisions farmers face in selecting irrigation systems at a time of rising energy costs and tight energy supplies. Selected irrigation systems for three simulated farm situations are identified to examine some of the relationships between the size and type of farm and the irrigation system selection criteria, response to rising energy costs, and power plant and irrigation system conversion potentials.

The irrigation systems in the study were chosen because they are either the most commonly used in the United States or because they exhibit energy conservation potential.

Many tables and graphs are used throughout the text to illustrate further detail.

A limited number of copies of this report (ERS–670) are available from U.S. Department of Agriculture, Economic Research Service, Natural Resource Economics Division, Washington, D.C. 20250.

Blueprint for Clean Water

by Deborah A. Sheiman

This 24-page booklet, published by the League of Women Voters Education Fund, details the Clean Water Act of 1977. It details the act's intent, track record, and pressures for change, and provides the latest information on the recent amendments to the construction grants program. It discusses the different types of water pollutants and their impact on biological systems, the history of the Clean Water Act and how it works to control the major sources of water pollution, the economics of pollution and pollution control, and the successes and failures of the act.

This booklet (Publication No. 639) is available for 75 cents (plus 50 cents handling charge for each order placed) from the League of Women Voters of the United States, 1730 M Street, N.W., Washington, D.C. 20036.

Tropical Agricultural Hydrology

Edited by R. Lal and E. W. Russell

This book is a compilation of papers presented at a conference organized by the International Institute of Tropical Agriculture in Ibadan, Nigeria. All authors are specialists who are familiar with tropical forest ecosystems. Some of the research includes watershed management in the tropics, ecological conditions in a forest ecosystem, management and catchment hydrology, and estimating soil and water loss.

This book will be of interest to all who are concerned with the global problems of water management and land use, as well as those involved in the research and planning of agriculture in the tropics.

This book is available for $62.95 from John Wiley & Sons, Inc., One Wiley Drive, Somerset, N.J. 08873.

Summaries of Brush Management and Range Improvement Research 1980–81

by the Texas Agricultural Experiment Station

This report is a result of 5 years of expanded efforts by the Experiment Station to seek solutions to the brush problem through both fundamental and applied research. Much of this research emphasizes the development and refinement of brush and weed control technologies which can be used as integral components of brush management systems. The research is also concerned with wildlife habitat, the ecology and physiology of woody plants, and methods of artificial revegetation.

A copy of this report (CPR–3968–4014B) is available from the Department of Agriculture Communications, Texas A&M University, College Station, Tex. 77843.

Soil Erosion

by Dusan Zachar

This book is about wind and water erosion. It is divided into five chapters: basic terminology, classification of soil erosion, problems and methods of soil erosion research, erosion factors and conditions governing soil erosion and erosion processes, and distribution of erosion. It contains many photographs and other illustrations.

The book is designed for agronomists, geographers, pedologists, ecologists, nature conservationists, and anyone else interested in the conservation, utilization, and improvement of the soil.

This book is available for $102.50 from Elsevier Science Publishing Co., Inc., 52 Vanderbilt Avenue, New York, N.Y. 10017.

Recent Soil Surveys Published

by the Soil Conservation Service

Arkansas: Perry County.
Kansas: Neosho County.
Kentucky: Monroe County.
Missouri: St. Charles County and St. Louis County Area.
New Mexico: Taos County Area.
Pennsylvania: Beaver and Lawrence Counties and Lackawanna and Wyoming Counties.
Puerto Rico: Arecibo Area.
South Dakota: Fall River County.
Wyoming: Teton County.

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